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$$\therefore z^3 + (G/F + K/E + H/D)z^2 + (GK/EF + GH/DF + HK)DEz + GHK/DEF = 0.$$

$$\therefore (z + G/F)(z + K/E)(z + H/D) = 0.$$

\therefore The roots are $-G/F$, $-K/E$, $-H/D$, or

$$\frac{2\gamma - \alpha - \beta}{2\alpha\beta - \gamma\alpha - \gamma\beta}, \quad \frac{2\beta - \alpha - \gamma}{2\gamma\alpha - \beta\gamma - \beta\alpha}, \quad \frac{2\alpha - \beta - \gamma}{2\beta\gamma - \alpha\beta - \alpha\gamma}.$$

PROBLEMS FOR SOLUTION.

ALGEBRA.

185. Proposed by L. E. DICKSON, Ph. D., Assistant Professor of Mathematics, The University of Chicago.

Without introducing radicals, eliminate x and y from the equations

$$ax^2 + bx + c = 0, \quad ay^2 + by + d = 0, \quad ax^2y^2 + bxy + e = 0.$$

186. Proposed by L. E. DICKSON, Ph. D., Assistant Professor of Mathematics, The University of Chicago.

Eliminate x and y from the equations

$$ax^3 + bx^2 + cx + d = 0,$$

$$ay^3 + by^2 + cy + e = 0,$$

$$ax^3y^3 + bx^2y^2 + cxy + f = 0,$$

the eliminant to be rational in d, e, f .

GEOMETRY.

207. Proposed by W. W. HART, University High School, Chicago, Ill.

According to Gauss the circumference of a circle can be divided into n equal parts by ruler and compass when and only when n is a prime of the form $2 \cdot 2^p + 1$.

The following construction gives good partial results for n equals *any* integer. If AB is the diameter of the circle, and C is the vertex of the equilateral triangle ABC , and if D is a point on AB at the distance $2AB/n$ from A , then draw the line CD cutting the circle at E and F ; E being the more remote from C . $AE = 1/n$ circumference approximately. For low values of n this method is very practical; is it practical in general? How great is the error?

208. Proposed by W. J. GREENSTREET, A. M., Editor of The Mathematical Gazette, Stroud, England.

Tangents drawn to two confocal parabolas from a point on the common tangent intersect at the same angle as the axes of the parabolas.